

5 **CLAIMS**

We claim:

1. / A computerized method for production management comprising:
determining a reduced quantity of a requested product quantity in a customer
10 order in reference to the inverse of the probability of profit of the product;
and
communicating the reduced quantity to a production management process.
2. The computerized method of claim 1, wherein the determining further comprises:
15 iteratively determining a graceful reduction of the requested product quantity
from a time shortfall, from the inverse profit probability, and from a
reduced number of plurality of products, until the customer accepts the
reduced quantity or until the time shortfall is non-existent.
- 20 3. The computerized method of claim 1, the method further comprising:
determining that the requested product quantity can not be satisfied within a
customer target time period.
4. A computerized method for production management comprising:
25 / (a) determining that at least one request for a plurality of products exceeds a
production capacity of a vendor, wherein the request for a plurality of
products includes a quantity associated with each of the plurality of
products from process and inventory operation data and from customer
order data; and
30 (b) determining a quantity of each of the plurality of products corresponding
to a vendor maximum profit of the requests for a plurality of products,
from a degradation of the quantity associated with at least one of the
plurality of products.
- 35 5. The computerized method of claim 4, the method further comprising:

- 5 (c) communicating the quantity of each of the plurality of products
corresponding to a maximum vendor profit of the requests for a plurality
of products.

6. The computerized method of claim 4, wherein the determining (a) further
10 comprises:

- (a)(1) obtaining process and inventory operation data, the data further
comprising an inventory quantity for each of the plurality of products;
(a)(2) obtaining customer order data; the data further comprising an
15 identification of each of the plurality of products, a requested quantity of
each of the plurality of products, and an associated target time of each of
the plurality of requested products;
(a)(3) determining an effective quantity for each of the plurality of products to be
produced from the requested quantity of each of the plurality of products
and from the inventory quantity for each of the plurality of products;
20 (a)(4) determining an actual time to produce all of the plurality of products to be
produced, from the effective quantity for each of the plurality of products
to be produced; and
(a)(5) determining that at least one request for a plurality of products exceeds a
production capacity of a vendor, from the effective quantity of the at least
25 one of the plurality of products, from the requested quantity of the at least
one of the plurality of products, and from the target time of the at least one
of the plurality of products.

7. The computerized method of claim 6, wherein the obtaining (a)(1) action is
30 performed after the obtaining (a)(2) action.

8. The computerized method of claim 6, wherein the determining (a)(5) further
comprises:

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(a)(5)(i)

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(a)(5)(iii)

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(b)(1)

(b)(2)

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(b)(4)

- 5 (b)(5) determining a graceful decrement from the time shortfall, from the profit probability, and from a decremented number of plurality of products;
- (b)(6) updating the objective value from the graceful decrement;
- (b)(7) determining the actual quantity to be produced for each of the plurality of products, from the graceful decrement, and from the unit time of
- 10 manufacture; and
- (b)(8) determining an actual time to produce all of the plurality of products to be produced, from the actual quantity to be produced for each of the plurality of products.

15 12. The computerized method of claim 11, wherein determining (b)(4), further comprises:

- (b)(4)(i) dividing the profit of a production of one of the plurality of products in the customer order into the profit of all of the plurality of products in the customer order, yielding a portion of total profit attributable to the
- 20 one product ; and
- (b)(4)(ii) determining a profit probability from the portion of total profit attributable to the one product subtracted from (b)(4)(i)

13. A computerized method for production management comprising:

- 25 (a) determining that at least one request for a plurality of products exceeds a production capacity of a vendor, wherein the request for a plurality of products includes a quantity associated with each of the plurality of products from process and inventory operation data
- (b) determining an inverse profit probability from the profit of a production of one of the plurality of products in the request, and from the profit of all of the plurality of products in the customer order;
- 30 (c) determining a graceful decrement from the time shortfall, from the inverse profit probability, and from a decremented number of plurality of products;
- 35 (d) updating the objective value from the graceful decrement;

- 5 (e) determining the actual quantity to be produced for each of the plurality of products, from the graceful decrement ; and
- (f) determining an actual time to produce all of the plurality of products to be produced, from the actual quantity to be produced for each of the plurality of products.

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14. The computerized method of claim 13, wherein the determining (a) further comprises:

- (a)(1) determining that at least one request for a plurality of products exceeds a production capacity of a vendor beyond a predetermined margin, from the effective quantity of the at least one of the plurality of products, from the requested quantity of the at least one of the plurality of products, and from the target time of the at least one of the plurality of products.

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15. The computerized method of claim 14, wherein the determining (a)(1) further comprises:

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- (a)(1)(i) determining a batch objective value for producing and delivering each of the plurality of products, from the effective quantity of the at least one of the plurality of products, from the requested quantity of the at least one of the plurality of products;
- (a)(1)(ii) determining the total production time of the plurality of products from the batch objective value of each of the plurality of products; and
- (a)(1)(iii) comparing the target time to the total production time of the plurality of products.

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16. The computerized method of claim 14, wherein the determining (a)(1) further comprises:

- (a)(1)(i) obtaining process and inventory operation data, the data further comprising an inventory quantity for each of the plurality of products;

(a)(1)(iv) determining an actual time to produce all of the plurality of products to be produced, from the effective quantity for each of the plurality of products to be produced.

20 18. The computerized method of claim 13, wherein the method further comprises:

(h) communicating to the customer each of the time shortfalls; and

30 determining a reduced quantity of a requested product quantity in a customer
order in reference to the inverse of the probability of profit of the product;
and
communicating the reduced quantity to a production management process.

- 5 20. The computer-readable medium of claim 19, wherein the determining further comprises:

iteratively determining a graceful reduction of the requested product quantity
from a time shortfall, from the inverse profit probability, and from a
reduced number of plurality of products, until the customer accepts the
10 reduced quantity or until the time shortfall is non-existent.

21. The computer-readable medium of claim 19, the method further comprising:
determining that the requested product quantity can not be satisfied within a
customer target time period.

- 15 22. A computer-readable medium having computer-executable instructions to cause a
computer to perform a method for production management comprising:

- (a) determining that at least one request for a plurality of products exceeds a
production capacity of a vendor, wherein the request for a plurality of
products includes a quantity associated with each of the plurality of
20 products from process and inventory operation data and from customer
order data; and
(b) determining a quantity of each of the plurality of products corresponding
to a vendor maximum profit of the requests for a plurality of products,
25 from a degradation of the quantity associated with at least one of the
plurality of products.

23. The computer-readable medium of claim 22, the method further comprising:

- (c) communicating the quantity of each of the plurality of products
30 corresponding to a maximum vendor profit of the requests for a plurality
of products.

24. The computer-readable medium of claim 22, wherein the determining (a) further
comprises:

- 5 (a)(1) obtaining process and inventory operation data, the data further
comprising an inventory quantity for each of the plurality of products;
- (a)(2) obtaining customer order data; the data further comprising an
identification of each of the plurality of products, a requested quantity of
each of the plurality of products, and an associated target time of each of
10 the plurality of requested products;
- (a)(3) determining an effective quantity for each of the plurality of products to be
produced from the requested quantity of each of the plurality of products
and from the inventory quantity for each of the plurality of products;
- (a)(4) determining an actual time to produce all of the plurality of products to be
15 produced, from the effective quantity for each of the plurality of products
to be produced; and
- (a)(5) determining that at least one request for a plurality of products exceeds a
production capacity of a vendor, from the effective quantity of the at least
one of the plurality of products, from the requested quantity of the at least
20 one of the plurality of products, and from the target time of the at least one
of the plurality of products.

25 25. The computer-readable medium of claim 24, wherein the obtaining (a)(1) action is
performed after the obtaining (a)(2) action.

26. The computer-readable medium of claim 24, wherein the determining (a)(5)
further comprises:

- 30 (a)(5)(i) determining that at least one request for a plurality of products
exceeds a production capacity of a vendor beyond a predetermined
margin.

27. The computer-readable medium of claim 24, wherein the determining (a)(5)
further comprises:

- 35 (a)(5)(i) determining a batch objective value for producing and delivering
each of the plurality of products, from the effective quantity of the

- 5 at least one of the plurality of products, from the requested quantity
of the at least one of the plurality of products;
- (a)(5)(ii) determining the total production time of the plurality of products
from the batch objective value of each of the plurality of products;
and
- 10 (a)(5)(iii) comparing the target time to the total actual production time of the
plurality of products.

28. The computer-readable medium of claim 24, wherein the predetermined margin
further comprises a predetermined absolute quantity margin.

- 15 29. The computer-readable medium of claim 22, wherein determining (b) for each
product in the order, further comprises:
- (b)(1) determining a time shortfall in the production of each of the plurality of
products from actual time to produce all of the plurality of products to be
20 produced, and from the target time;
- (b)(2) communicating to the customer each of the time shortfalls;
- (b)(3) receiving from the customer information representing reduction in the
quantity associated with at least one of the plurality of products;
- (b)(4) determining a profit probability from the profit of a production of one of
25 the plurality of products in the customer order, and from the profit of all of
the plurality of products in the customer order;
- (b)(5) determining a graceful decrement from the time shortfall, from the profit
probability, and from a decremented number of plurality of products;
- (b)(6) updating the objective value from the graceful decrement;
- 30 (b)(7) determining the actual quantity to be produced for each of the plurality of
products, from the graceful decrement; and
- (b)(8) determining an actual time to produce all of the plurality of products to be
produced, from the actual quantity to be produced for each of the plurality
of products.
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5 30. The computer-readable medium of claim 29, wherein determining (b)(4), further comprises:

(b)(4)(i) dividing the profit of a production of one of the plurality of products in the customer order into the profit of all of the plurality of products in the customer order, yielding a portion of total profit attributable to that one product ; and

(b)(4)(ii) determining a profit probability from the portion of total profit attributable to the one product subtracted from (b)(4)(i)

10 31. / A computer-readable medium having computer-executable instructions to cause a computer to perform a method for production management comprising:

(a) determining that at least one request for a plurality of products exceeds a production capacity of a vendor, wherein the request for a plurality of products includes a quantity associated with each of the plurality of products from process and inventory operation data

20 (b) determining a profit probability from the profit of a production of one of the plurality of products in the request, and from the profit of all of the plurality of products in the customer order;

(c) determining a graceful decrement from the time shortfall, from the profit probability, and from a decremented number of plurality of products;

25 (d) updating the objective value from the graceful decrement;

(e) determining the actual quantity to be produced for each of the plurality of products, from the graceful decrement; and

(f) determining an actual time to produce all of the plurality of products to be produced, from the actual quantity to be produced for each of the plurality of products.

30 32. The computer-readable medium of claim 31, wherein the determining (a) further comprises:

35 (a)(1) determining that at least one request for a plurality of products exceeds a production capacity of a vendor beyond a predetermined margin, from the

5 effective quantity of the at least one of the plurality of products, from the
requested quantity of the at least one of the plurality of products, and from
the target time of the at least one of the plurality of products.

33. The computer-readable medium of claim 32, wherein the determining (a)(1)

10 further comprises:

(a)(1)(i) determining a batch objective value for producing and delivering
each of the plurality of products, from the effective quantity of the
at least one of the plurality of products, from the requested quantity
of the at least one of the plurality of products;

15 (a)(1)(ii) determining the total production time of the plurality of products
from the batch objective value of each of the plurality of products;
and

(a)(1)(iii) comparing the target time to the total production time of the
plurality of products.

20 34. The computer-readable medium of claim 32, wherein the determining (a)(1)
further comprises:

(a)(1)(i) obtaining process and inventory operation data, the data further
comprising an inventory quantity for each of the plurality of products;

25 (a)(1)(ii) obtaining customer order data; the data further comprising an
identification of each of the plurality of products, a requested quantity
of each of the plurality of products, and an associated target time of
each of the plurality of requested products;

30 (a)(1)(iii) determining an effective quantity for each of the plurality of products
to be produced from the requested quantity of each of the plurality of
products and from the inventory quantity for each of the plurality of
products; and

35 (a)(1)(iv) determining an actual time to produce all of the plurality of products
to be produced, from the effective quantity for each of the plurality of
products to be produced.

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35. The computer-readable medium of claim 32, wherein the predetermined margin further comprises an absolute quantity margin.

10 comprises:

- (g) determining a time shortfall in the production of each of the plurality of products from actual time to produce all of the plurality of products to be produced, and from the target time;
- (h) communicating to the customer each of the time shortfalls; and
- 15 (i) receiving from the customer information representing a reduction in the quantity associated with at least one of the plurality of products.

20 method of:

- (a) determining that at least one request for a plurality of products exceeds a production capacity of a vendor, wherein the request for a plurality of products includes a quantity associated with each of the plurality of products from process and inventory operation data;
- 25 (b) determining an inverse profit probability from the profit of a production of one of the plurality of products in the request, and from the profit of all of the plurality of products in the customer order;
- (c) determining a graceful decrement from the time shortfall, from the inverse profit probability, and from a decremented number of plurality of
- 30 products;
- (d) updating the objective value from the graceful decrement;
- (e) determining the actual quantity to be produced for each of the plurality of products, from the graceful decrement, and from the unit time of manufacture; and

- 5 (f) determining an actual time to produce all of the plurality of products to be produced, from the actual quantity to be produced for each of the plurality of products.

38. The computer data signal of claim 37, wherein the determining (a) further
10 comprises:

- (a)(1) determining that at least one request for a plurality of products exceeds a production capacity of a vendor beyond a predetermined margin, from the effective quantity of the at least one of the plurality of products, from the requested quantity of the at least one of the plurality of products, and from
15 the target time of the at least one of the plurality of products.

39. / A computer-readable medium having stored thereon an data structure representing a reduced quantity of a requested product quantity produced by a method comprising:
determining that the quantity of the requested product can not be satisfied by a
20 vendor within a customer target time period; and
iteratively determining a graceful reduction of the requested product quantity from a time shortfall, from the inverse profit probability, and from a reduced number of plurality of products, until the customer accepts the reduced quantity or until the time shortfall is non-existent.

25 40. The computer-readable medium of claim 39, produced by the method further comprising:
communicating the reduced quantity to a vendor production process.

30 41. The computer-readable medium of claim 39, wherein the determining further comprises:
determining that at least one request for a plurality of products exceeds a production capacity of the vendor beyond a predetermined margin.

5 42. The computer-readable medium of claim 39, wherein the determining further comprises:

 determining a time shortfall in the production of each of the plurality of products
 from actual time to produce all of the plurality of products to be produced,
 and from the target time;

10 communicating to the customer each of the time shortfalls;

 receiving from the customer information representing reduction in the quantity
 associated with at least one of the plurality of products;

 determining a profit probability from the profit of a production of one of the
 plurality of products in the customer order, and from the profit of all of the
15 plurality of products in the customer order;

 determining a graceful decrement from the time shortfall, from the profit
 probability, and from a decremented number of plurality of products;

 updating the objective value from the graceful decrement;

 determining the actual quantity to be produced for each of the plurality of
20 products, from the graceful decrement, and from the unit time of
 manufacture; and

 determining an actual time to produce all of the plurality of products to be
 produced, from the actual quantity to be produced for each of the plurality
 of products.

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43. A computer-readable medium having stored thereon an data structure representing
a reduced quantity of a requested product quantity produced by a method comprising:

30 (a) determining that at least one request for a plurality of products exceeds a
 production capacity of a vendor, wherein the request for a plurality of
 products includes a quantity associated with each of the plurality of
 products from process and inventory operation data

 (b) determining a profit probability from the profit of a production of one of
 the plurality of products in the request, and from the profit of all of the
 plurality of products in the customer order;

- 5 (c) determining a reduced quantity from the time shortfall, from the profit probability, and from a decremented number of plurality of products;
- (d) updating the objective value from the reduced quantity;
- (e) determining the actual quantity to be produced for each of the plurality of products, from the reduced quantity, and from the unit time of
- 10 manufacture; and
- (f) determining an actual time to produce all of the plurality of products to be produced, from the actual quantity to be produced for each of the plurality of products.

15 44. The computer-readable medium of claim 43, wherein the determining (a) further comprises:

- (a)(1) determining that at least one request for a plurality of products exceeds a production capacity of a vendor beyond a predetermined margin, from the effective quantity of the at least one of the plurality of products, from the requested quantity of the at least one of the plurality of products, and from
- 20 the target time of the at least one of the plurality of products.

45. The computer-readable medium of claim 43, wherein the method further comprises:

- 25 (g) determining a time shortfall in the production of each of the plurality of products from actual time to produce all of the plurality of products to be produced, and from the target time;
- (h) communicating to the customer each of the time shortfalls; and
- (i) receiving from the customer information representing reduction in the
- 30 quantity associated with at least one of the plurality of products.

46. ✓ A system for transacting in electronic commerce comprising:
a processor; and

5 software means operative on the processor for degrading the quantity of an order
of a plurality of products using an inverse probability of profit function in
reference to profits from each of the products in the order.

47. / A computerized apparatus for production management comprising:

10 a demand analyzer, that determines if a vendor can satisfy a quantity of customer
demand for a product, from a database of process and inventory operation
data and from a database of customer order data; and
a graceful quantity degrader, operably coupled to the demand analyzer, that yields
a degraded quantity from the quantity of customer demand using an
15 inverse probability of profit function.

48. The computerized apparatus of claim 47, wherein the graceful quantity degrader
yields the degraded quantity for each of the products that the customer indicated a
reduced quantity thereof, from a time shortfall, the inverse probability of profit, and from
20 a decremented number of plurality of products of the customer order.

49. / A computerized apparatus for production management comprising:

an excess quantity determiner, that determines that one or more customer requests
for a plurality of products, exceed a production capacity of the vendor
25 within a prescribed time period; and
a reduced quantity determiner, operably coupled to the excess quantity
determiner, that yields a reduced quantity, from an inverse probability of
profit of the reduced quantity.

30 50. The computerized apparatus of claim 49, wherein the excess quantity determiner
further comprises:

a determiner of batch objective values, from an effective quantity of at least one
product identified in the request, and from the corresponding production
speed of each of a plurality of product batches in the request;

5 a determiner of actual total production time of the at least one products in the
request, from the sum of the batch objective values; and
a determiner of a production time shortfall, from the actual total production time,
and a target production time, wherein the production shortfall indicates an
excess quantity.

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51. The computerized apparatus of claim 49, wherein the reduced quantity determiner
further comprises:

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an inverse profit probability determiner, wherein the inverse profit probability is
determined from a projected profit of a product in a customer order, and
from the profit of the entire customer order;

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a gracefully-decremented quantity determiner, operably coupled to the inverse
profit probability determiner, wherein the gracefully-decremented quantity
is determined for each of the products that the customer indicated a
reduced quantity, and determined from a time shortfall, the inverse profit
probability, and from a decremented number of plurality of products;

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an objective-value determiner, operably coupled to the gracefully-decremented
quantity determiner, wherein the objective-value is determined for each
product in the customer order from the gracefully-decremented quantity,
and from the previous objective value;
an actual-quantity determiner, operably coupled to the objective-value determiner,
wherein the actual-quantity is determined from the objective-value, a
production speed of the product, and from the inventory quantity of the
product; and

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a total-production-time determiner, operably coupled to the actual-quantity
determiner, wherein the total-production-time is determined as the sum of
objective value of each product.

52. , A computerized apparatus for production management comprising:

5 an excess quantity determiner, that determines that one or more customer requests
for a plurality of products exceed a production capacity of the vendor
within a prescribed time period;

a reduced quantity determiner, operably coupled to the excess quantity
determiner, that yields a reduced quantity, from an inverse probability of
10 profit of the reduced quantity, wherein the reduced quantity determiner
further comprises:

a gracefully-decremented quantity determiner, yielding a reduced
quantity, operably coupled to the inverse profit probability
determiner, wherein the gracefully-decremented quantity is
15 determined for each of the products that the customer
indicated a reduced quantity, and determined from a time
shortfall, the inverse probability of profit, and from a
decremented number of plurality of products.

20 53. The computerized apparatus of claim 52, wherein the inverse profit probability is
determined from a projected profit of a product in the customer request, and from the
profit of the entire customer request.

54. ✓ A computer-readable medium comprising:
25 a demand analyzer, that determines if a vendor can satisfy a quantity of customer
demand for a product, from a database of process and inventory operation
data and from a database of customer order data; and
a graceful quantity degrader, operably coupled to the demand analyzer, that yields
a degraded quantity from the quantity of customer demand using an
30 inverse probability of profit function

55. The computer-readable medium of claim 54, wherein the graceful quantity
degrader yields the degraded quantity for each of the products that the customer indicated
a reduced quantity thereof, from a time shortfall, the inverse probability of profit, and
35 from a decremented number of plurality of products of the customer order.

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56. / A computer-readable medium comprising:
an excess quantity determiner, that determines that one or more customer requests
for a plurality of products, exceed a production capacity of the vendor
within a prescribed time period; and
10 a reduced quantity determiner, operably coupled to the excess quantity
determiner, that yields a reduced quantity, from an inverse probability of
profit of the reduced quantity.

57. The computer-readable medium of claim 56, wherein the excess quantity
15 determiner further comprises:

a determiner of batch objective values, from an effective quantity of at least one
product identified in the request, and from the corresponding production
speed of each of a plurality of product batches in the request;
a determiner of actual total production time of the at least one products in the
20 request, from the sum of the batch objective values; and
a determiner of a production time shortfall, from the actual total production time,
and a target production time, wherein the production shortfall indicates an
excess quantity.

- 25 58. The computer-readable medium of claim 56, wherein the reduced quantity
determiner further comprises:

an inverse profit probability determiner, wherein the inverse profit probability is
determined from a projected profit of a product in a customer order, and
from the profit of the entire customer order;
30 a gracefully-decremented quantity determiner, operably coupled to the inverse
profit probability determiner, wherein the gracefully-decremented quantity
is determined for each of the products that the customer indicated a
reduced quantity, and determined from a time shortfall, the inverse profit
probability, and from a decremented number of plurality of products;

5 an objective-value determiner, operably coupled to the gracefully-decremented
quantity determiner, wherein the objective-value is determined for each
product in the customer order from the gracefully-decremented quantity,
and from the previous objective value;
an actual-quantity determiner, operably coupled to the objective-value determiner,
10 wherein the actual-quantity is determined from the objective-value, a
production speed of the product, and from the inventory quantity of the
product; and
a total-production-time determiner, operably coupled to the actual-quantity
determiner, wherein the total-production-time is determined as the sum of
15 objective value of each product.

59. ✓ A computer-readable medium comprising:

an excess quantity determiner, that determines that one or more customer requests
for a plurality of products exceed a production capacity of the vendor
20 within a prescribed time period;

a reduced quantity determiner, operably coupled to the excess quantity
determiner, that yields a reduced quantity, from an inverse probability of
profit of the reduced quantity, wherein the reduced quantity determiner
further comprises:

25 a gracefully-decremented quantity determiner, yielding a reduced
quantity, operably coupled to the inverse profit probability
determiner, wherein the gracefully-decremented quantity is
determined for each of the products that the customer
indicated a reduced quantity, and determined from a time
30 shortfall, the inverse probability of profit, and from a
decremented number of plurality of products.

60. The computer-readable medium of claim 59, wherein the inverse profit
probability is determined from a projected profit of a product in the customer request, and
35 from the profit of the entire customer request.